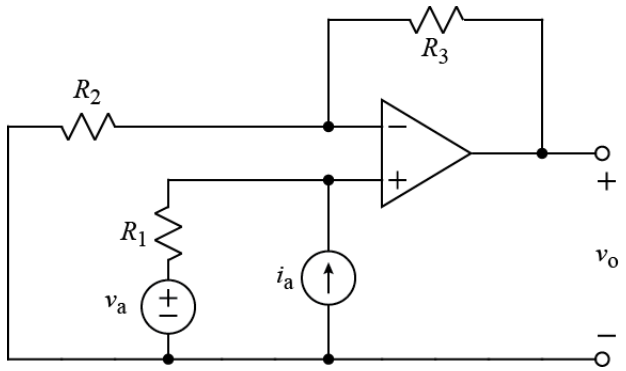
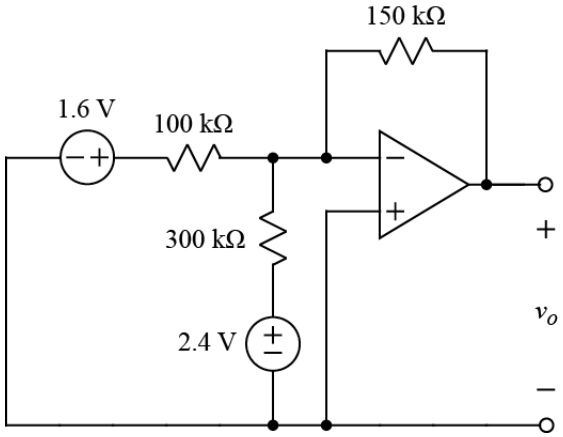
Homework 4

1.



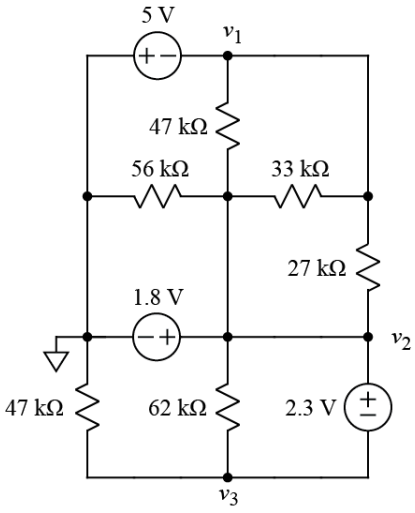
The op-amp operates in the linear mode. Using an appropriate model of the op-amp, derive an expression for v_o in terms of not more than v_a, i_a, R_1, R_2, and R_3.

2.



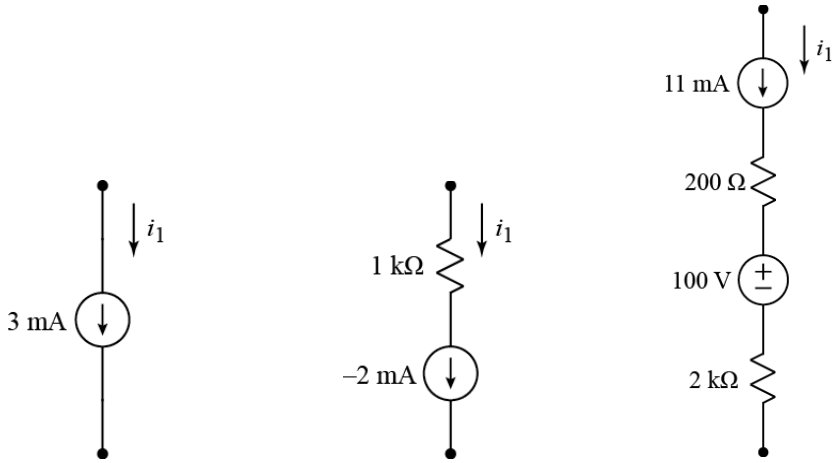
The op-amp operates in the linear mode. Using an appropriate model of the op-amp, find the value of v_o.

3.

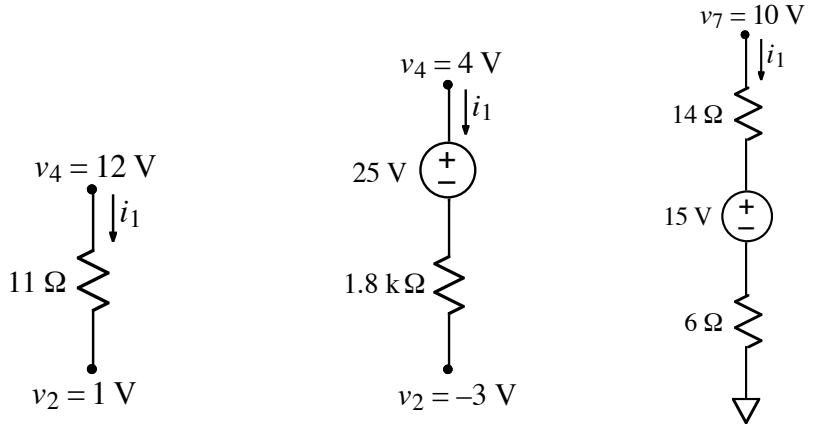


Find the node voltages at all the labeled nodes in the above circuit.

4.

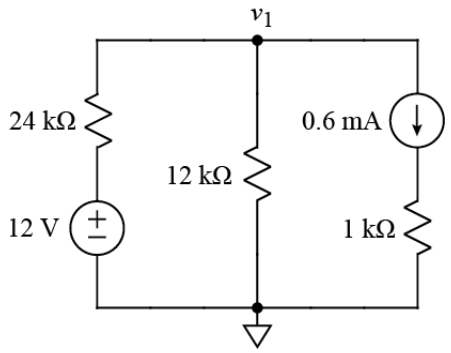


a) Find the value of current, i_1, for each of the above branches taken from circuits.



b) Find the value of current, i_1, for each of the above branches taken from circuits.

5.



For the circuit shown, use the node-voltage method to find v_1.

Ans: 1. $v_o = (v_a + i_a R_1)(1 + R_3/R_2)$ 2. $v_o = –2(1.8\text{V}) = –3.6\text{V}$ 3. v_1=–5V, v_2=1.8V, v_3=–0.5V
4. a) 3 mA, –2 mA, 11mA b) 1A, –10mA, –0.25A
5. $v_1 = –0.8$ V